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PRELIMINARY LIST OF UPPER ST. REGIS FUNGI

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(WITH PLATES 167–169)

It was my good fortune to spend the last week in August, 1915, with Mr. and Mrs. N. H. Luttrell at their camp on the Upper St. Regis, surrounded by virgin forests of balsam fir, spruce, and hemlock, often mixed with birch and rarely with maple and beech.

Fungi were unusually abundant, for it was the height of the season and one of the best years for fleshy forms ever known in the Adirondacks. Every facility was at hand, also, for collecting, drying, and otherwise caring for the specimens; and a dozen friends stood ready to lend me a helping hand.

Under these favorable circumstances, it was deemed advisable to make both a qualitative and a quantitative survey of the more conspicuous fungi appearing in the vicinity during the week, with the hope of assisting the large number of mycologists and other nature lovers who visit the Adirondacks during late summer.

The number of species collected was over 300, and this number might have been largely increased if attention had been given to inconspicuous woody and leathery forms and to species occurring on leaves. A number of the rarer species found have not yet been definitely determined and will not appear in the list to follow.

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Special attention was given to edible and poisonous fungi. About 35 species were eaten, many of them in quantity and prepared in various ways. Many other edible species were not eaten because the specimens had to be preserved. Those accustomed to the fleshy forms occurring about New York City are entirely unprepared for the remarkable difference in the Adirondack fungous flora, which is distinctly northern unmixed with southern elements and is associated with coniferous forests rather than deciduous woodlands in which oaks and chestnuts are dominant.

FIG. 1. Landing at Camp Kanosa.

The following list contains a few notes on points of special interest. The abundance of a species is indicated by exponents, the numerals *1–5* denoting a definite number of times collected and the letters *n*, *nn*, and *nnn* meaning "frequent," "common," and "very common" respectively.

A. MYXOMYCETES

Fuligo septica[2]
Reticularia Lycoperdon[2]

B. ASCOMYCETES

Cordyceps militaris.[1] Found in Isaria form only.
Cudonia lutea[n]
Daldinia concentrica[2]
Helvella Infula[2]

Lachnea hemisphaerica.[2] Very abundant at one place in low mixed woods.
Lachnea scutellata.[2] On dead beech logs.
Leotia lubrica[n]
Macropodium macropus[nn]
Mitrula vitellina[1]
Peziza abietina.[1] Very abundant in one spot in low mixed woods.
Spathularia velutipes[4]
Xylaria polymorpha[n]

C. HYMENOMYCETES

a. TREMELLALES

Tremella lutescens.[2] On hemlock logs.
Tremella mycetophila.[1] On *Collybia dryophila.*
Tremellodon gelatinosum.[1] On coniferous log.

b. AGARICALES

1. Thelephoraceae

Craterellus cornucopioides.[1] Abundant at one spot in the edge of coniferous woods.
Thelephora laciniata[n]

2. Clavariaceae

Members of this family were very abundant everywhere on the ground in the woods. The most abundant species was what I determined as *Clavaria cinerea.* Other species found were:

Clavaria fusiformis[2]
Clavaria pinophila[1]
Clavaria pistillaris[1]

3. Hydnaceae

Members of this family were very rare, as is usually the case. Three species belonging to the *H. zonatum* group were found, but these have not been definitely determined.

Hydnum caput-ursi.[1] On a decaying spot in a living beech trunk.
Hydnum ochraceum[2]

4. Polyporaceae

Bjerkandera adusta[1]
Cerrena unicolor[1]
Coltricia perennis[3]
Coltricia tomentosa[3]
Coriolus abietinus[n]
Coriolus versicolor[n]
Daedalea confragosa[4]
Elfvingia fomentaria[1]
Elfvingia megaloma[n]
Fomes roseus[n]
Fomes ungulatus[n]

Fomitiporia prunicola[1]
Gloeophyllum hirsutum[nn]
Hapalopilus rutilans[1]
Inonotus radiatus[1]
Ischnoderma fuliginosum[n]. The usual form on coniferous logs.
Phaeolus sistotremoides[1]
Piptoporus suberosus[n]
Polyporus elegans[n]
Porodaedalea Pini[n]
Pycnoporus cinnabarinus[1]
Pyropolyporus conchatus[1]
Pyropolyporus igniarius[1]
Scutiger griseus.[1] This was found on a shady bank in coniferous woods. The young pileus was pale-rosy-isabelline, the hymenium white, and the taste mild.
Spongipellis borealis.[1] The specimens were unusually small.
Tyromyces caesius[2]
Tyromyces chioneus[n]
Tyromyces guttulatus[3]
Tyromyces lacteus[2]

5. Boletaceae

Boletinus pictus[nnn]. This beautiful edible species was more abundant than I have ever seen it before. It was difficult to obtain specimens free from insects, even when picked very young.
Ceriomyces affinis[1]
Ceriomyces auriporus[1]
Ceriomyces ferruginatus[1]
Ceriomyces nebulosus?[n]. This rather pretty edible species had been found previously at Lake Placid.
Ceriomyces subglabripes[3]
Ceriomyces viscidus[nn]. Common under birch trees.
Rostkovites granulatus.[5] Two distinct forms of this species were found, the ordinary pinkish form and one which was yellowish throughout, slimy, with a pleasant, slight odor of bitter almonds, a mild taste, and dark-dirty-yellow tubes.
Rostkovites subaureus[nn]. Mostly under pines planted about the camp.
Suillellus luridus.[1] Gregarious at the edge of coniferous woods.
Tylopilus felleus[nnn]. Very conspicuous by reason of its abundance and size. Many specimens were tasted and all were found to be exceedingly bitter.

6. Agaricaceae

Agaricus diminutivus[n]
Chanterel aurantiacus[2]
Chanterel infundibuliformis[nnn]
Chanterel umbonatus[nn]
Claudopus nidulans.[1] At the base of a small dead coniferous trunk. The specimens were young and fresh and were carefully tested by more than one person for a mephitic odor but none was present. I have never noticed such an odor in this species.

Clitocybe clavipes[n]
Clitocybe eccentrica[3]
Clitocybe infundibuliformis[n]
Clitocybe sinopica.[2] On lawn in the open.
Clitocybe subditopoda[2]
Clitocybe virens[2]
Clitocybe spp.
Collybia acervata[nn]
Collybia confluens[nn]. This species has been transferred to *Marasmius*.
Collybia dryophila[nn]
Collybia maculata[nn]. Always spotted and very bitter even when cooked.

FIG. 2. View of Upper St. Regis Lake from one of the guest houses at Camp Kanosa.

Collybia platyphylla.[2] Under maple and birch.
Collybia radicata.[4] Mostly under beech, attached to the roots.
Collybia scabriuscula[1]
Collybia strictipes?[n]
Collybia tuberosa[n]. On decaying *Lactaria turpis* and possibly other gill-fungi. Several years ago in Maine, I found this species abundant on *Lactaria turpis*.
Collybia spp.
Coprinus fimetarius[1]
Coprinus micaceus.[1] Under birch and maple.
Cortinarius armillatus[nnn]

Cortinarius erythrinus[5]
Cortinarius lilacinus[n]
Cortinarius purpurascens[2]
Cortinarius semisanguineus[nn]. Attacked by insects when very young.
Cortinarius spp.
Cortinellus rutilans[1]
Entoloma cuspidatum?[1]
Entoloma sericeum[3]
Entoloma strictius?[1]
Entoloma spp.
Flammula penetrans[n]
Flammula sapinea[1]
Flammula spumosa[3]
Galera Hypnorum[2]
Galera tener.[1] On the lawn.
Hygrophorus chlorophanus[1]
Hygrophorus coccineus[n]
Hygrophorus laetus.[1] Several hymenophores of this beautiful species were found in swampy ground between Upper Spectacle and Lower Spectacle lakes.
Hygrophorus miniatus[n]
Inocybe spp. Nearly a dozen species were found, most of them in rather sterile soil in open woods or wood borders.
Laccaria laccata[nn]
Laccaria striatula[n]
Lactaria camphorata[1]
Lactaria deceptiva[nn]. Very large, reaching 8 inches in diameter, dirty-white, cottony on the margin, acrid. This species is found under conifers and takes the place of *Lactaria piperata* found in oak groves about New York City.
Lactaria Gerardii[2]
Lactaria lignyota[nn]
Lactaria mucida[2]
Lactaria oculata[1]
Lactaria parva[1]
Lactaria subdulcis[nnn]
Lactaria theiogala[n]
Lactaria torminosa.[3] This poisonous species may be recognized by its zonate surface and conspicuously woolly margin.
Lactaria turpis.[3] An interesting species, very dull in color, occurring in low places in woods and usually attacked by *Collybia tuberosa*.
Lactaria varia[1]
Lactaria spp.
Lepiota amianthina[5]
Lepiota clypeolaria[n]
Lepiota fuscosquamea.[3] This species is very closely related to *L. clypeolaria*.
Lepiota naucina[1]
Leptonia serrulata[2]
Limacella illinita.[1] Under birch trees.

Marasmius campanulatus[2]
Marasmius oreades.[1] On the lawn.
Marasmius rotula[4]
Melanoleuca albissima[nnn]. Growing gregariously in coniferous woods in large groups covering many square feet and conspicuous at a considerable distance. Many specimens were tasted and all were found to be bitter.
Melanoleuca melaleuca.[2] Found in abundance in one spot at the edge of deciduous woods.

FIG. 3. Some of the guests at Camp Kanosa who assisted in collecting fungi.

Mycena Leaiana[1]
Mycena pura[n]
Mycena spp.
Omphalia campanella[2]
Omphalia chrysophylla[n]
Omphalia fibula[4]

Omphalia umbellifera[1]
Omphalia spp.
Paxillus atrotomentosus[nn]. Very large and more abundant than I have ever seen it before, occurring on stumps in coniferous woods.
Paxillus involutus[nn]
Paxillus panuoides[1]
Pholiota squarrosa.[1] Abundant on a fallen deciduous trunk.
Pholiota spp.
Pluteus cervinus.[2] Only two small specimens were seen.
Russula albidula[1]
Russula compacta[nn]. Large, edible, free from insects.
Russula depallens?[3]
Russula emetica[n]

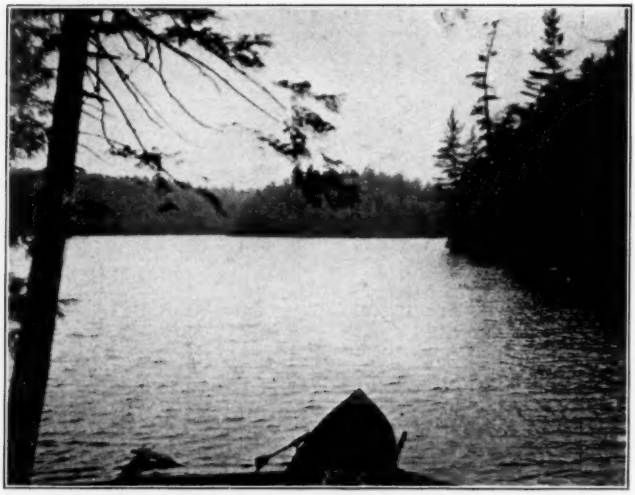

FIG. 4. Lower Spectacle Lake.

Russula foetens[1]
Russula foetens?[n]. More common, somewhat smaller, and with less odor than typical *R. foetens*.
Russula lutea?[n]
Russula spp. A beautiful rosy-stemmed reddish species was common everywhere in coniferous woods and also a purplish species with a white stem. Both of these were edible and easily distinguished from *R. emetica*. Several other species were collected which will be determined later.
Stropharia semiglolata.[2] Found sparingly in its usual habitat.
Vaginata plumbea[nn]. The yellowish form of this species was common everywhere. I do not remember seeing the gray form.

Vaginata plumbea strangulata". I had an excellent opportunity to study this variety in all its stages and, for this locality, it is apparently entirely distinct from *V. plumbea*. It was not found to vary in color, but Professor Atkinson recently told me that he once collected a yellowish form of it.

Venenarius Frostianus""

Venenarius muscarius". The usual orange form of northern latitudes.

Venenarius phalloides". The usual umbrinous form was the common one, just as I found at Lake Placid, while the white form or "destroying angel" was collected only four times. In the vicinity of New York City, the dark form would hardly be noticed during an entire season, while the white form is one of the most abundant fleshy fungi in our woodlands, which accounts for the number of deaths due to its use by ignorant persons.

D. GASTEROMYCETES

Puffballs were not very abundant, if we except *Scleroderma aurantium*, the hard-skinned puffball. In addition to the species listed below, I probably obtained *L. atropurpureum* and *L. pulcherrimum*, as well as two or three other species not definitely determined.

Crucibulum vulgare[1]

Lycoperdon cyathiforme.[1] On the lawn near the camp.

Lycoperdon gemmatum"

Lycoperdon pyriforme[2]

Lycoperdon separans." Grassy places in the open.

Lycoperdon subincarnatum.[1] This beautiful species was found in abundance among chips and sticks in a low spot in the edge of mixed woods.

Scleroderma aurantium"". Abundant everywhere under all kinds of trees.

SPECIES USED FOR FOOD

Boletinus pictus
Ceriomyces viscidus
and several other species
Chanterel infundibuliformis
Chanterel umbonatus
Clavaria, several species
Collybia acervata
Collybia dryophila
Collybia radicata
Cortinarius lilacinus
Cortinarius semisanguineus
Craterellus cornucopioides
Hygrophorus coccineus
Hygrophorus miniatus
Laccaria laccata
Lactaria lignyota
Lactaria subdulcis
and several other species
Lepiota clypeolaria
Lycoperdon gemmatum
Lycoperdon pyriforme
Lycoperdon Wrightii
Paxillus involutus
Rostkovites granulatus
Rostkovites subaureus
Russula compacta
Russula lutea?
and several other species
Vaginata plumbea strangulata
Vaginata plumbea

PRINCIPAL POISONOUS AND BITTER SPECIES COLLECTED

Ceriomyces ferruginatus
Collybia maculata
Lactaria torminosa
Melanoleuca albissima
Russula emetica
Russula foetens
Suillellus luridus
Tylopilus felleus
Venenarius muscarius
Venenarius phalloides

NEW YORK BOTANICAL GARDEN.

CAMP KANOSA WITH ST. REGIS MOUNTAIN IN THE DISTANCE

VIEW OF UPPER ST. REGIS LAKE AND SEVERAL OTHERS FROM ST. REGIS MOUNTAIN. MT. MARCY AND OTHER PEAKS OVER 5,000 FEET HIGH ARE VISIBLE IN THE DISTANCE ON THE RIGHT. CAMP KANOSA IS SITUATED ON THE NARROW RIDGE TO THE LEFT OF THE CENTER BETWEEN UPPER ST. REGIS AND UPPER SPECTACLE LAKES

THE FERAX GROUP OF THE GENUS SAPROLEGNIA[1]

A. J. Pieters

(With Plate 170, Containing 2 Figures)

Nees von Esenbeck ('23) first separated the then known forms of water molds into two genera, *Achlya* and *Saprolegnia*, but, until the time of de Bary's first paper ('52) in 1852, this distinction was not recognized by subsequent workers; de Bary revived the classification of the older author. Meanwhile all forms of water molds had been called *Saprolengia ferax* or *Achlya prolifera*, without any clear distinction being made between these genera. In 1850, Thuret ('50) described the swarm spores of a form that he called *S. ferax* Kütz., and he figured, for the first time, the oogonia. Later de Bary ('81) referred to this figure when he renamed *S. ferax, S. Thureti.*

In 1857 Pringsheim (57) contributed to the literature the description of *S. monoica* with excellent figures; other forms of *Saprolegnia*, those without antheridial branches, he considered as belonging to *S. ferax*. In 1873 he stated that further observation had convinced him that there was no true specific distinction between the forms with an antheridium on every oogonium and those in which the antheridia are almost or quite wanting. They differ, he says, "only in the relative number of antheridia." He therefore grouped all forms of *Saprolegnia* with round, pitted, many spored oogonia into the "*ferax*" group.

In 1881, there appeared a paper by de Bary ('81) in which he united *S. monoica, S. torulosa*, and *S. Thureti* (*S. ferax*) into a group which he called the *ferax* group. He had not yet distinguished *S. mixta*. In his description of *S. monoica*, de Bary followed Pringsheim, but added that in some cases the antheridial branches arise from hyphae remote from the oogonium, or, in other words, are not androgynous.

[1] Contribution from the Botanical Laboratory of the Univ. of Mich. No. 147.

Pringsheim had maintained that if one starts with a form having antheridia and continues the culture for some time, the number of antheridial branches gradually decreases in successive cultures until finally one may have forms without any antheridia. De Bary, however, showed that in his work each form, when secured in a pure culture, maintained its distinctive antheridial characters unchanged and suggested that impure cultures explained Pringsheim's results. Among the members of his "*ferax*" group de Bary distinguished *S. torulosa* by the arrangement of the oogonia in chains, *S. Thureti* (*S. ferax*) by the single large round oogonia, almost none of which have antheridia, and *S. monoica* by the constant presence of androgynous antheridia.

At this time, de Bary did not yet recognize *S. mixta,* nor did he include *S. hypogyna* Pringsheim in the *ferax* group, although this species had been described by Pringsheim in 1873 as a variety of *S. ferax*. In 1888, however, in de Bary's last paper ('88), published after his death, he included in the "*ferax*" group *S. Thureti, S. hypogyna, S. monoica, S. mixta, S. torulosa, S. dioica* (*S. diclina* of Humphrey), and *S. anisospora*. Pringsheim had previously included in the *ferax* group all those forms having smooth, round, pitted, many-spored oögonia, differing only in the number of oögonia accompanied by antheridia. De Bary seems to have departed from the historical conception of the "*ferax*" group and added to it such forms as *S. anisospora* with unpitted oögonium wall, eccentric oöspores and zoöspores of two sizes.

I prefer to follow Humphrey ('92) who limits the "*ferax*" group to *S. ferax, S. mixta,* and *S. monoica,* and these are undoubtedly the forms included under this term by Pringsheim, although he did not recognize *S. mixta* as being distinct from *S. ferax*.

If we turn to the original descriptions to ascertain the limits of the species, we find that in all cases the oögonia are described as round, smooth, and pitted and with a varying number of oöspores. De Bary, indeed, states that the oögonia of *S. Thureti* (*ferax*) are generaly larger than those of *monoica,* but as between *mixta* and *ferax* no distinction based on the oögonia is made. The specific difference, as de Bary plainly states, lies in the number of oögonia accompanied by antheridia, *S. mixta*

having antheridia on about one half of the oögonia, *S. ferax* scarcely ever producing antheridia, while the male organs are found on every oögonium of *S. monoica*. De Bary also calls attention to the fact that the hyphae of *S. mixta* are flaccid and delicate in appearance, while those of the other two species are stiff and strong.

De Bary is very careful to make it clear that *S. ferax* is not wholly without antheridia (see '81, p. 92), and it is because this qualification on the part of de Bary has been sometimes overlooked that we find such statements as that by Kauffman ('08) that *S. ferax* "is said to have *no* antheridia." The formation of oögonia in the empty sporangium cases, thus forming the so-called "cylindrical" oögonia is also not given by de Bary as a character distinctive of *S. ferax*. There doubtless are forms in which this phenomenon occurs more often than in other forms, but the character is of no specific value. Humphrey says of *S. mixta*, "antheridia . . . , absent from a part of the oögonia, sometimes from a large part."

My attention was first called to the question of what is *S. mixta* or *S. ferax* by Kauffman's paper ('08) in which on page 368 he describes a form as *S. mixta*, though 75–90 per cent. of the oögonia were accompanied by antheridia, while on the following page he describes another form in which the male organs were found on only 1 or 2 per cent. of the oögonia. In experiments with the latter form, Kauffman was able to increase the number of antheridia to 25 per cent. of the oögonia but no more. A strict interpretation of the original description of *S. mixta* would exclude both of the forms with which Kauffman worked, as would also be the case with those the writer has collected and on which he found never less than 80 to 90 per cent. of antheridia. Kauffman considered that his form F. must be a form of *S. mixta* because he found antheridia, although he recognizes the difference between his two forms and notes that the hyphae of his form "H." are "rather slender" (p. 368).

Klebs ('99) found that when he grew *S. mixta* in a solution of haemoglobin, no antheridia were produced and this has also been the experience of the writer. On the other hand, Prof. W. C. Coker, of North Carolina, has stated in correspondence with

the writer that in a strain of *S. ferax* which he cultivated, he was able to get from 1 to 95 per cent. of antheridial oögonia, depending on the medium used.

In 1911 I collected at Heidelberg, Germany, a species which I determined as *S. ferax* because I failed to find any antheridia on fly cultures. From time to time I secured antheridia when the fungus was grown in artificial media but not until 1913, having carried the culture to Ann Arbor, did I note antheridia on a fly culture. This led me to question the identification and to re-examine the original material on fly, this having been preserved in alcohol; not one antheridium was to be found.

During that winter I collected a number of cultures from the various dishes of algae kept in the botanical laboratories at the University of Michigan. Each form was isolated by making a single spore culture and a number of these could be referred only to *S. ferax* although in no case were antheridia entirely wanting. To test the matter of the production of antheridia, fly cultures were prepared and kept in a cool room, and the oögonia having antheridia were counted by examining the culture in the dish under a 16 mm. objective and a 12 × eyepiece. With this combination the antheridia can be plainly seen and the culture does not need to be disturbed. The number of oögonia counted and the number with antheridia are recorded in the following table.

CULTURE NO.	DATE	TEMPERATURE	NO. COUNTED	NO. WITH ANTHERIDIA
25	Nov. 19, 1913	Cool (12°–15° C.)	200	11
21F	" 20, "	"	200	19
21F	" " "	Room Temp. (22° + C.)	200	0
28	" 19, "	Cool	100	4
28	" " "	Room Temp.	Many, not counted	0
17	(*S. mixta*)	" "	" " "	90% at least
33	Nov. 20, 1913	Cool	100	1
34	" " "	"	125	3
35	" 23, "	"	100	14
35	" " "	"	100	11
35	" " "	"	100	13

A second culture and count gave the following results:

CULTURE NO.	DATE	TEMPERATURE	NO. COUNTED	NO. WITH ANTHERIDIA
21F	Dec. 9, 1913	Room temp. (22° + C.)	Many	0
21F	" " "	Cool (12°–15° C.)	100	15
21F	" 24, "	Room temp.	80	1 (doubtful)
25	" " "	Cool	100	9
25	" " "	"	100	12
28	" 18, "	"	100	3
28	" 24, "	"	100	3
28	" " "	Room temp.	60	0
33	" 18, "	Cool	100	2
33	" " "	"	100	6
33	" 24, "	Room temp.	100	4
34	" 18, "	Cool	100	2
34	" 24, "	Room temp.	100	7
34	" " "	" "	100	1
35	" 11, "	Cool	100	2
35	" " "	"	100	5
35	" 13, "	Room temp.	100	19
35	" 18, "	Cool	100	7
35	" " "	"	100	7
35	" 24, "	Room temp.	100	5
37	" 18, "	Cool	100	1
37	" " "	"	100	9
37	" 23, "	Room temp.	300	0

The average number of oögonia accompanied by antheridia in cultures grown at a low temperature (about 12° to 15° C.) is shown in the following table:

Culture Number	Average Percentage of Oögonia With Antheridia
21F	8
25	8.8
28	4
33	4
34	2
35	8.4
37	5

In all the cultures cited above, the oögonia were substantially alike, of the same size and pitting, with slight fluctuating variations. The vegetative parts and the sporangia were also alike, but all of these cultures differed strikingly from number 17 which I collected in Germany and number 82, collected at Ann Arbor and which proved to belong to the same species as 17. These two forms had a flaccid delicate mycelium just as de Bary described for *S. mixta* and as Kauffman noted in his culture "H." The pits on the oögonia, though present, were less prominent than on

the oögonia of *S. ferax,* and antheridia, usually of diclinous origin, were found on at least 90 per cent. of the oögonia. It is not impossible that single oögonia of *S. mixta* might be confused with those of *S. diclina* Humphrey, which has diclinous antheridia on round, poorly pitted oögonia, but the latter species, which I collected at Ann Arbor as number 38, has, as de Bary and Humphrey state, the oögonia mostly at the ends of long hyphae, rarely lateral and never racemose, while the lateral racemose arrangement is the rule in *S. mixta.*

While it is probable that mistaken identifications may occur in the study of poor material of several of these species, the case is worst as between *S. ferax* and *S. mixta.* If the almost complete absence of antheridia in the one case and their presence on one half of the oögonia in the other is decisive in these species, then neither of the two forms studied by Kauffman nor those discussed in this paper belong to *S. ferax* or to *S. mixta.* At the same time, there is no doubt that such forms as my numbers 17 and 82 are quite distinct from the others and that numbers 21F, 25, 28, 33, 34, 35, and 37 all belong to the same species. The number of oögonia provided with antheridia may vary in the same form depending on the medium in which it is grown. As already stated, Klebs found that in *S. mixta* the number varied from 0 to 90 per cent., Coker in correspondence, and Kauffman in the paper referred to have also recorded such a variation. In my study of the forms determined as belonging to *S. ferax,* I found that oögonia-bearing antheridia were much more common on the parts of the mycelium near the body of the fly than on the outer portions of the mycelium, and also that the antheridia were much more easily seen when the culture was young than after it had grown rather old. Under the influence of low temperature, there were generally more antheridia than when the culture was kept at room temperature, about 22 degrees Cent. *Saprolegnia monoica* is said to have antheridia of androgynous origin on every oögonium, but when I grew this in 0.05 per cent. haemoglobin solution, the number of antheridia present varied from 0 to 17 per cent. of the number of oögonia. When a mycelium that had previously been grown in pea extract, was transferred to 0.01 per cent. haemoglobin plus *M*/200 levulose, the oögonia were small,

but each one was accompanied by an antheridium and the latter was either diclinous or androgynous. When such a mycelium was transferred to a solution in which the levulose was replaced by an equal concentration of dextrose, the oögonia produced were fewer, but very much larger and not more than 5 per cent. had antheridia. It is evident then that the number of antheridia present may vary with conditions, and that there may also be a natural variability independent of food conditions; the place of origin of the antheridia is also variable. Shall we then go back to Pringsheim's notion and consider these all forms of the same species? To one who has carried many pure cultures of these organisms through several years and who has observed how quite constant each form is under a certain set of conditions, this is out of the question; the forms are different. It is evident that these species make up a group of closely related forms representing tendencies to vary along different lines. Of these, *S. monoica* has the most complete sexuality with antheridia of prevailing androgynous origin; *S. mixta* has less complete sexuality, antheridia of prevailing diclinous origin and a more delicate mycelium; while *S. ferax* represents a complex of forms in which the loss of sexuality has gone much further that it has in the other species. The members of this last subgroup are probably very numerous. There is, of course, no doubt but that the form studied by de Bary was as he described it, almost free from antheridia. The form studied by Coker differed slightly from the ones I had, and Dr. Kauffman has verbally stated that the form he collected as *S. ferax* had many barrel shaped oögonia. Altogether, there seem to be almost as many forms as cultures studied, but all agree in the small number of oögonia found with antheridia. There is no intergradation between the forms with few antheridia and those clearly belonging to *S. mixta,* with one half or more of the oögonia accompanied by antheridia. Furthermore, so far as records go and so far as my own experience goes, the forms with a large number of antheridia have always had the "slender" mycelium first described by de Bary. Until further work throws additional light on this matter I am inclined to believe that all the forms with stiff, strong mycelium and a small number of antheridia on fly cultures at a temperature of 12 to 15 degrees C. must

be called *S. ferax,* while those with weak mycelium and with antheridia on one half *or more* of the oögonia belong to *S. mixta* as described by de Bary.

This merely recognizes the fact that this species is a complex of forms of which de Bary happened to find one, and in this form the loss of sexuality had gone further than in most of the members of the complex.

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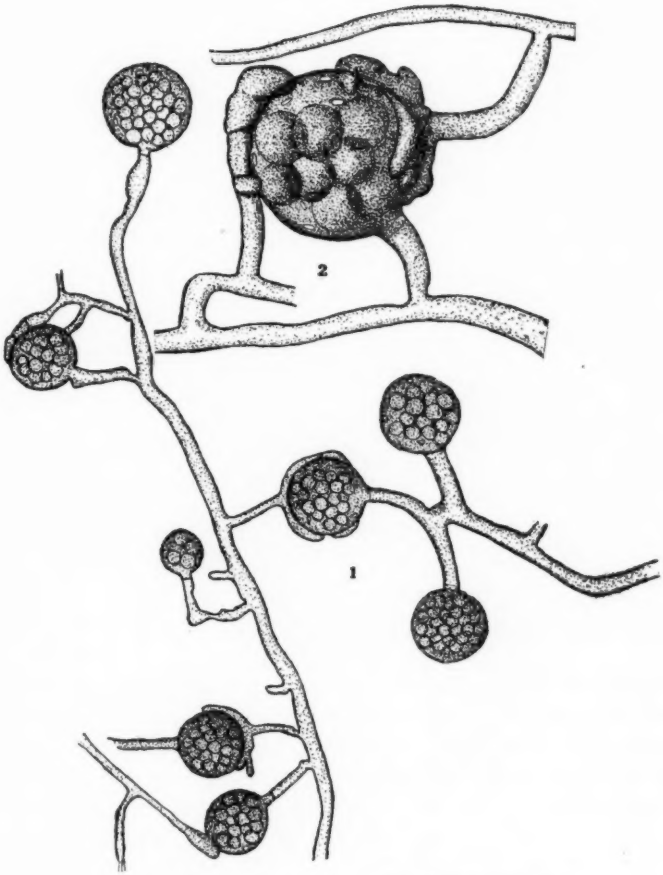
EXPLANATION OF PLATE CLXX

Fig. 1. *Saprolegnia ferax* (Gruith.) Thuret from fly culture in cool window of number 25; showing oögonia with androgynous and diclinous antheridia. × 167.

Fig. 2. Oögonium of *S. monoica* Pringsh. showing androgynous and diclinous antheridia on the same oögonium. × 440.



1. SAPROLEGNIA FERAX (GRUITH.) THURET
2. SAPROLEGNIA MONOICA PRINGSH.

UREDINALES OF PORTO RICO BASED ON COLLECTIONS BY F. L. STEVENS[1]

J. C. Arthur

(*Continued from page 255*)

76. **Aecidium abscedens** sp. nov.

Pycnia epiphyllous, numerous on brownish spots 4–9 mm. across, prominent, golden-yellow becoming dark-brown, hemispheric, subcuticular, 140–200 μ broad by about half as high.

Aecia hypophyllous, numerous in crowded groups, cupulate; peridia short, cylindric, 0.1–0.3 mm. in diameter, soon open, coarsely lacerate, somewhat revolute, peridial cells colorless, somewhat overlapping, oblong, 11–16 by 20–37 μ, the outer wall 1.5–3 μ thick, smooth, the inner wall slightly thicker, moderately verrucose; aeciospores broadly ellipsoid or globoid, 18–21 by 20–27 μ wall pale-yellow, thin, 1–1.5 μ, very closely and finely verrucose.

On Rubiaceae:

Randia aculeata L., Mayagüez, May 2, *1125;* Cataño, Nov. 3, *4534;* Aguada, Nov. 22, *5089* (type).

A more recent collection, April 25, 1914, comes from Martin Pena, P. R., made by Johnston & Stevens *1886.*

The species is apparently heteroecious. It is markedly different in both gross and microscopic appearance from the Mexican *Aecidium pulverulentum* Arth., which is the only other aecial form known on *Randia,* the publication of the host of the South American *A. Randiae* P. Henn. as *Randia* having been changed to *Basanacantha* (Hedwigia **43**: 166. 1904).

77. Aecidium Borreriae Pat.; Duss, Énum. Champ. Guad. 7. 1903.

On Rubiaceae:

Hemidiodia ocimifolia (Willd.) K. Schum., Mayagüez, May 3, *1147.*

[1] Continued from Mycologia **7**: 255. 1915.

The species was described from material gathered by Pére Duss in Guadeloupe, and this is the second time it has been recorded.

78. AECIDIUM CIRCUMSCRIPTUM Schw.; Berk. & Curt. Jour. Phila. Acad. Sci. **2**: 283. 1853.

Aecidium Cissi Wint. Hedwigia **23**: 168. 1884.

ON CUCURBITACEAE:

Cissus sicyoides L., Mayagüez, May 10, 1912, *1bis, 2bis,* April 30, *995b;* San German, Jan. 19, *23a;* Luguillo, March 21, 1912, *65;* Corozal, Feb. 21, *404;* Manati, Nov. 5, *4303;* Aguado, Nov. 22, *5080;* Aguadilla, Nov. 25, *5225;* Jayome Alto, Dec. 3, *5680;* Guayanilla, Nov. 13, *5912;* Jayuya, Dec. 17, *5980;* El Gigante near Adjuntas, Dec. 15, *6012;* Cabo Rojo, Dec. 27, *6454;* River junction below Utuado, Dec. 30, *6505, 6548;* Preston's ranch near Naguabo, Dec. 31, *6759.*

The species on the same host has also been collected in Porto Rico by Underwood & Griggs, at Rio Piedras, June, July, 1901, *238,* and by E. W. D. Holway, at San Juan, Jan. 1911.

Similar specimens have been seen from Jamaica, collected by A. S. Hitchcock, Dec. 1890, G. von Lagerheim, Dec. 1892, F. S. Earle, Oct. 1902, L. M. Underwood, April, 1903, and September, 1906, *3302,* and E. W. D. Holway, Feb. 1915.

In the Schweinitz herbarium at the Philadelphia Academy of Sciences there is an original unmounted packet inscribed in Schweinitz's handwriting "*Aecidium circumscriptum.* Surinam." This is undoubtedly type material. It contains five fragments, belonging originally to three or four leaves. The largest fragment is about 6 by 9 cm., and two other of the fragments can be put together to show that one leaf was originally ovate, deeply cordate and entire, 9 cm. broad by 12 cm. long. About 150 groups of aecia occur on the specimen altogether, in good representative condition. This material has been studied at the New York Botanical Garden and the host pronounced to be *Cissus sicyoides,* Mr. Percy Wilson vouching for the same.

The Schweinitz material in host and fungus agrees closely in

appearance and microscopic detail with the Stevens' Porto Rican material, and with many other collections from other places, which have heretofore been given the Winterian name. The Schweinitz name, being much older, is therefore given preference.

79. AECIDIUM DECOLORATUM Schw.; Berk. & Curt. Jour. Phila. Acad. Sci. **2**: 283. 1853.

Aecidium Clibadii Syd. Ann. Myc. **1**: 333. 1903.

ON CARDUACEAE:

Clibadium erosum (Sw.) DC., Jajome Alto, Dec. 3, *5655*.

The type material in the Schweinitz collection at Philadelphia consists of the larger part of four or five leaves, which originally measured about 16 to 22 cm. long and 10–12 cm. wide. They bear numerous groups of aecia. The inscription in Schweinitz's handwriting reads, "*Aecidium decoloratum*—in foliis an Syng. —Surinam." A likeness was detected between these large composite leaves and those of the Stevens' collection. Through the kindness of the authorities of the Philadelphia Academy of Sciences, it was possible to submit the Schweinitz material to Mr. Percy Wilson of the New York Bot. Garden, who readily ascertained the host to be *Clibadium surinamense* L., a common composite plant of Dutch Guiana.

80. AECIDIUM EXPANSUM Diet. Hedwigia **38**: 258. 1899.

ON CARDUACEAE:

Mikania cordifolia (L. f.) Willd., Coamo Springs, Jan. 1, *90;* Mayagüez, April 30, *995a,* May 1, *1061,* May 2, *1130,* June 13, *2220,* Oct. 31, *3894;* Yauco, Oct. 3, *3126;* Monte de Oro near Cayey, Dec. 3, *3742;* Lares, Nov. 22, *4934, 4935;* Jajome Alto, Dec. 3, *5758;* River junction below Utuado, Dec. 17, *6069,* Dec. 30, *6585, 6873.*

Mikania sp., Villa Alba, Jan. 3, *135.*

No original material of this species has been available for comparison, but the agreement of the Porto Rican material with the description of the Brazilian fungus is remarkably close, the only discrepancy being the slightly smaller spore measurements for

the South American collection, which is well within the limits of laboratory variation.

The species shows a luxuriant and abundant development, and is doubtless heteroecious.

81. AECIDIUM WEDELIAE Earle, Muhlenbergia 1: 16. 1901.

ON CARDUACEAE:

Wedelia trilobata (L.) Hitch. (*W. carnosa* Pers., *Stemmodontia trilobata* Small), Mayagüez, July 27, 1912, *72*, Jan. 15, *283*, April 27, *835;* Cabo Rojo, June 11, *2184;* Utuado, Nov. 8, *4595a*, *4607;* Maricao, Nov. 18, *4704a;* St. Ana, Dec. 31, *6691;* El Gigante near Adjuntas, Dec. 15, *8010;* without locality, Jan. 14, 1914, *6781*.

This form is very common in Porto Rico. Collections from the island have been examined from Mayagüez, by A. A. Heller *4580*, and G. P. Clinton *54*, April 1904, from Utuado by Underwood & Griggs, June–July 1901, from San Juan and Santurce, by E. W. D. Holway, Jan. 1911, from Trujillo Alto, by J. R. Johnston *1042*, August 1913, and from Campo Alegre, by J. A. Stevenson *2475*, Dec. 1915.

Although recorded from other West Indian islands the only specimen examined is from Jamaica, by E. W. D. Holway *213*, Feb. 1915.

It has been suggested by Dr. Stevens that this rust may be the aecial form of *Puccinia canaliculata* on *Cyperus*, which is known to produce aecia on *Xanthium* in the northern United States. The morphological characters favor the suggestion.

FORM GENUS UREDO

Paraphyses absent, mostly forms belonging to *Aecidiaceae*, Nos. 82 to 98.
Paraphyses present.
Free and peripheral, mostly forms belonging to *Aecidiaceae*, Nos. 99 to 104.
Imbricated to form a pseudoperidium, forms probably belonging to *Uredinaceae*, Nos. 105 to 108.
United into a peridium, cellular above, belonging to *Uredinaceae*, No. 109.

82. UREDO PASPALICOLA P. Henn. Hedwigia **44**: 57. 1905.

ON POACEAE:

Paspalum conjugatum de Bary, Adjuntas, Nov. 22, *4966*.

This thin-walled, pale-spored rust, which is now reported for North America for the first time, has also been collected in Guatemala, on *Paspalum Humboldtianum*, Jan. 11, 1915, by E. W. D. Holway *64*. The two collections agree closely with the type collection on *P. conjugatum* from Peru, as careful study shows.

83. UREDO DICHROMENAE Arth. Bull. Torrey Club **33**: 31. 1906.

ON CYPERACEAE:

Dichromena ciliata Vahl, Mayagüez, April 30, *927*.

Dichromena radicans Cham. & Schl., Guayama, April 6, *847*.

The type specimen of the species was collected on *D. ciliata*, at Mayagüez, April, 1904, by G. P. Clinton. The form was also collected in Jamaica by L. M. Underwood, May, 1903, *2892*.

The form is given for South America by Mayor in his list of Colombian *Uredinales* (Mém. Soc. Neuch. Sci. **5**: 581. 1913).

84. UREDO FUIRENAE P. Henn. Hedwigia Beibl. **38**: 70. 1899.

ON CYPERACEAE:

Fuirena umbellata Rottb., Santurce, Jan. 22, *253;* Aguas Buenas, Feb. 9, *300;* Mayagüez, April 30, *920*, Oct. 31, *3953;* St. Catalina, Aug. 28, *2743;* Cataño, Nov. 3, *4531*.

This rust was also gathered on the same host at Bayamon, P. R., Jan. 1911, by E. W. D. Holway, and in Cuba, Oct. 1904, by Baker & Wilson *2214*, and March 1907, by F. S. Earle *652*.

The species was described from Brazil on *F. umbellata*, and it has been distributed from India, also on the same host. No teliospores have been found in connection with it. It differs strongly from the uredinia of the *Fuirena* rust in the southern United States, *Puccinia Fuirenae* Cooke, by having two pores, instead of three or four as in that species, and in other characters.

85. UREDO DIOSCOREAE P. Henn. Hedwigia **35**: 255. 1896.

ON DIOSCOREACEAE:

Rajania cordata L., Bayamon, without date, *4162;* Utuado, Nov. 8, *4673;* Jajome Alto, Dec. 3, *5658, 5757;* El Gigante near Adjuntas, Dec. 15, *5948;* River junction below Utuado, Dec. 16, *6030;* St. Ana, Dec. 31, *6687.*

The only other collection of this rust from the West Indies known to the writer was made by E. W. D. Holway in Cuba, March, 1903. The Holway collection is not on *Rajania,* but on some undetermined species of *Dioscorea.* The spores of the Cuban material resemble those of the type, which was on *Dioscorea grandiflora* from Brazil, but appear slightly thinner walled, and a little more coarsely verrucose. All the Stevens' collections agree with the Cuban material, except that no. *5948* does not appear to vary at all from the type collection. The variations noted seem unimportant. Pore characters could not be determined, but the arrangement is probably equatorial.

86. UREDO NIGROPUNCTATA P. Henn. Hedwigia **35**: 254. 1896.

ON ORCHIDACEAE:

Bletia patula Hook., Maricao, April 3, *804a, 826.*

The species occurs on phanerogamic specimens in the N. Y. Bot. Garden of the same host from Cuba, March, 1903, Underwood & Earle *929,* and on *Bletia purpurea* (Lam.) DC. from Hayti, Aug., 1903, Geo. V. Nash *706,* and from the Bahamas, March, 1907, L. J. K. Brace *7011,* and Feb., 1910, Small & Carter *8876.*

87. UREDO ERYTHROXYLONIS Graz. Bull. Soc. Myc. Fr. **7**: 153. 1891.

ON ERYTHROXYLONACEAE:

Erythroxylon areolatum, L., Mona Island, Dec. 20, 21, *6148, 6448.*

The species has been collected in Prov. Havana, Cuba on *E. havanense* Jacq. in 1904, by C. F. Baker *4127* (Barth. Fungi Columb. *2287*), the host having recently been determined by Mr.

Percy Wilson of the N. Y. Bot. Garden. It was also collected in Prov. Pinar del Rio, Cuba, on a phanerogamic specimen of *E. havanense,* Dec., 1911, by Percy Wilson *11569.*

The spores of the two Porto Rican collections measure 16–20 by 21–27 μ, and largely are cinnamon-brown above and paler in color below. Most collections of the rust seen by the writer, and especially those on the same host as the type, *E. Coca,* have larger spores, 18–23 by 24–32 μ, which are concolorous. In a collection made by J. N. Rose *18916,* in Bolivia, Aug. 16, 1914, only about half of the spores are paler below. In some sori taken from a phanerogamic specimen of *E. areolatum 6449,* in the N. Y. Bot. Garden, with the same data as no. *6448* above, many spores measure quite as long as those found on *E. Coca.* It may be assumed, therefore, that variation in size and color of spores is incidental.

88. UREDO HYMENAEAE Mayor, Mem. Soc. Neuch. Sci. **5**: 585. 1913.

ON CAESALPINIACEAE:

Hymenaea Courbaril L., Joyuda, March 31, *962;* Mayagüez, May 3, *1157,* Oct. 31, *3897, 3901;* Añasco, Sept. 21, *3210,* Oct. 12, *3575;* Vega Baja, Nov. 5, *4324.*

This rust was described from Colombian material on an undetermined species of *Hymenaea.* Dr. Stevens's fine set doubtless makes the second lot to be collected. The rust exhibits characteristics of the subfamily *Raveneliatae,* in the elongated spore with equatorial pores.

89. **Uredo lutea** sp. nov.

Uredinia hypophyllous, abundantly scattered or in small groups on discolored spots, pustular, 0.3–0.7 mm. across, long covered by the brown overarching epidermis, finally sparingly pulverulent, subepidermal; paraphyses none; urediniospores pedicillate, irregularly ellipsoid or obovoid, 19–21 by 26–29 μ; wall cinnamon-brown, about 1.5 μ thick, moderately echinulate, the pores usually indistinct, 2 or rarely 3, equatorial.

ON CAESALPINIACEAE:

Cassia quinquangulata L. C. Rich., without locality or date, *404bis;* Maricao, April 4, *704;* Jayome Alto, Dec. 3, *5653;* Preston's ranch near Naguabo, Dec. 31, 6762.

This rust presents few salient features, either in the sorus or the spores. The host and the lack of any debarring characters would indicate that it belongs under *Ravenelia*. It does not, however, accord with any known species of that genus so far as can be ascertained.

90. UREDO ARACHIDIS Lagerh. Tromsö Mus. Aarsh. **17**: 106. 1894.

Uromyces Arachidis P. Henn. Hedwigia **35**: 224. 1896.

ON FABACEAE:

Arachis hypogea L., Dorado, Nov. 25, *5318*, *5319*.

The two collections by Stevens are the only ones from the West Indies known to the writer. The rust is probably not rare, however, as I have found at the N. Y. Bot. Garden that it occurs on a phanerogamic specimen of *A. hypogea* from Grenada, W. E. Broadway, Oct., 1905, and on one from Guadeloupe, Pére Duss *3581*, Dec., 1894.

A species of *Uromyces* has been described for this host from Surinam by Hennings, but the type material is said by Sydow (Monog. Ured. **2**: 346. 1910) to show only urediniospores. A species of *Puccinia* on the same host was described by Spegazzini in 1884 (An. Soc. Ci. Arg. **17**: 90) no material of which has been seen. There is no mention of urediniospores, and the relationship with material in hand is problematical.

91. UREDO CABRERIANA Kern & Kellerm. Jour. Myc. **13**: 25. 1907.

ON FABACEAE:

Erythrina glauca Willd., Bayamon, Feb. 23, *386*, Feb. 20, *441*, June 23, *2498*, without date, *4096*.

Porto Rican collections have been made on the same host at Rio Piedras, by J. R. Johnston *1099*, and J. A. Stevenson *2345*, and at Bayamon, Jan., 1911, by E. D. W. Holway.

It has been collected on the same host in Cuba as part of a phanerogamic specimen, in 1906, by Abarca & O'Donovan *2634*, communicated by Percy Wilson.

The type collection came from Guatemala. The host of the

type was determined by Capt. J. Donnell Smith as *Buettneria lateralis,* but after the Stevens' collections came to hand the original material was again submitted to Capt. Smith who found that through some error it had been wrongly reported, and was in fact *Erythrina glauca.* The Holway collection from Cuba was first said to be on *E. micropteryx,* which is clearly an error.

92. UREDO CUPHEAE P. Henn. Hedwigia **34**: 99. 1895.

ON LYTHRACEAE:

Cuphea Parsonsia R. Br., Cabo Rojo, June 15, *2279.*

This is the first collection of this rust in North America. The gross and microscopic appearance of the Porto Rican material agrees perfectly with that of the type, which was collected at Goyaz, Brazil by E. Ule *2001,* on an undetermined species of *Cuphea.*

93. **Uredo fallaciosa** sp. nov.

Uredinia hypophyllous, irregularly gregarious on somewhat discolored spots, roundish, 0.1–0.5 mm. across, tardily naked, pulverulent, fuscous; urediniospores ellipsoid or obovoid, 18–23 by 24–29 μ; wall pale yellow or slightly fuscous, 1–1.5 μ thick, moderately echinulate, the pores obscure.

ON RUBIACEAE:

Psychotria patens Sw., Maricao, April 3, *774* (type); Ponce, Nov. 8, *4341.*

The uredinia are not abundant in these collections. The sori are not prominent on the leaf surfaces, merely making an inconspicuous roughening that attracts attention chiefly by the slight discoloration. The sori are subepidermal, without paraphyses, and have the aspect of forms belonging to species of *Uromyces* and *Puccinia.* Three rusts with uredinia have been described by Hennings from South America, but in the absence of material for examination it is not possible to say if any of them include the Porto Rican form.

94. **Uredo sabiceicola** sp. nov.

Uredinia largely hypophyllous, scattered singly or in groups of 2–5 on small discolored spots 0.5–1 mm. across, round, small, 0.1–0.3 mm. in diameter, dull cinnamon-brown, subepidermal;

paraphyses peripheral, numerous, incurved, clavate, stout, 10–12 by 19–23 μ, the wall colorless, thin, 0.5 μ, somewhat thickened on the outer curved part, 1.5–2 μ, smooth; urediniospores obovoid, 16–23 by 25–29 μ; wall golden-yellow, thin, 1 μ, moderately verrucose-echinulate, the pores obscure.

ON RUBIACEAE:

Sabicea aspera Aubl., Mayagüez, May 1, *1047*.

This distinctive rust with its conspicuous paraphyses is evidently not the same as *Uredo Cephalanthi* Arth., which is without paraphyses. There appears to be no other form known that is at all closely related.

95. **Uredo proximella** sp. nov.

Uredinia chiefly hypophyllous, crowded in groups 2–4 mm. across, bullate, roundish or irregular, large, 0.3–0.9 mm. across, tardily naked, cinnamon-brown, pulverulent, ruptured epidermis conspicuous as a partial membranous covering; urediniospores broadly ellipsoid or obovoid, 18–20 by 19–24 μ; wall cinnamon-brown, thin, 1–1.5 μ, closely and finely echinulate, the pores rather indistinct, 4–6, scattered.

ON CICHORIACEAE:

Lactuca intybacea Jacq., Sabana Grande, March 30, *318*.

In the characters of both sori and spores this species bears considerable resemblance to the uredinia of *Puccinia hemisphaerica* (Peck) Ellis & Ev. It has been detected on specimens in the phanerogamic collection of the N. Y. Bot. Garden from St. Domingo, March, 1913, Rose, Fitch & Russell *4015*, and from Cuba, March, 1909, N. L. Britton *2161*.

96. UREDO BIOCELLATA Arth. Bull. Torrey Club **33**: 517. 1906.

ON CARDUACEAE:

Pluchea odorata (L.) Cass., Ponce, Dec. 4, *5393;* Vega Baja, Feb. *22*, *360a*.

Pluchea purpurascens (Sw.) DC., Santurce, May 21, *1799;* Cabo Rojo, Sept. 28, *3186;* Mona Island, Dec. 20, 21, *6198*.

The species was also found in the phanerogamic herbarium of the N. Y. Bot. Garden on *P. odorata*, collected at Guanica, P. R., Jan., 1899, by C. F. Millspaugh *713*.

In the same herbarium it occurs on *P. purpurascens* from St. Domingo, collected March 1913, by Rose, Fitch & Russell *4294*.

Heretofore the species has only been known from southern Florida.

97. **Uredo vicina** sp. nov.

Uredinia hypophyllous, scattered, round, 0.3–0.5 mm. across, soon open, dark cinnamon-brown, pulverulent, ruptured epidermis evident; urediniospores globoid, often flattened above, 24–29 μ in diameter; wall chestnut-brown, 1.5–2 μ thick, closely echinulate, the pores 4, equatorial.

ON CARDUACEAE:

Wedelia lanceolata DC., Guanica, Feb. 3, *365*, Feb. 10, *365bis* (type).

The spores of this species are entirely unlike the urediniospores of *Uromyces pianhyensis*, on another species of *Wedelia*, especially in size and in having decidedly thicker walls with more pores that are clearly evident.

98. UREDO SPARGANOPHORI P. Henn. Hedwigia 43: 160. 1904.

ON CARDUACEAE:

Struchium Sparganophorum (L.) Kuntze (*Sparganophorum Vaillantii* Gärt.), Mayagüez, April 29, *523*, April 30, *911*.

Although the leaves were well covered with uredinia, no trace of telia or aecia could be found. The same rust was detected in the phanerogamic collection of the N. Y. Bot. Garden on the same host from Green Island, Jamaica, March, 1908, Wm. Harris *10254*.

99. UREDO GYMNOGRAMMES P. Henn. Hedwigia 34: 337. 1895.

ON POLYPODIACEAE:

Dryopteris Poiteana (Bory) Urban, Villa Alba, Jan. 3, *86*.

The same fungus was collected in Jamaica on *Dryopteris patens* (Sw.) Kuntze, May, 1903, by L. M. Underwood *2869*, and in Cuba, on *Pityrogramma calomelaena* (L.) Link, March, 1903, by E. W. D. Holway.

Uredo superficialis (Speg.) Lagerh., a very similar fungus, was collected in Jamaica on *Anemia hirsuta* (L.) Sw., Feb., 1903, by L. M. Underwood *1170*.

Both of these forms on ferns are to be included under the *Uredinales* with considerable doubt, on account of the form of the sorus. They need to be studied cytologically and also as to their development.

100. **Uredo Stevensiana** sp. nov.

Uredinia chiefly epiphyllous, scattered or in small groups on discolored spots, elliptical, small, 0.2–0.5 mm. long, brownish-yellow, rather tardily naked by a longitudinal rupture of the epidermis; paraphyses numerous, chiefly peripheral, erect or incurved, clavate, 10–15 by 29–50 μ, the wall colorless, thin, about 1 μ, somewhat thicker above, 2–4 μ; urediniospores ellipsoid, 16–21 by 23–27 μ; wall pale-yellow or colorless, thin, 1–1.5 μ, closely and rather prominently echinulate, the pores indistinct.

ON POACEAE:

Axonophus compressus (Sw.) Beauv. (*Paspalum compressum* Rasp.), Mayagüez, Jan. 9, 1913, *237*, Feb. 8, *280*, April 30, *923*.

Paspalum Humboldtianum Flügge, Cuernavaca, Mex., Sept. 28, 1899, E. W. D. Holway *3510* (type).

Paspalum paniculatum L., Vega Baja, Feb. *22*, *373*.

Paspalum (? *Helleri* Nash), Mayagüez, April 30, *932*.

Paspalum plicatulum Michx., Mayagüez, April 30, *943*.

This grass rust differs from *Uredo paspalicola*, which it closely resembles in general appearance, by the presence of numerous paraphyses and the somewhat smaller spores. The collections made by Dr. Stevens are the only ones seen or known from the West Indies, or in fact from any locality, except the one collected by Holway from central Mexico. The Mexican collection is ample, the rust well displayed and free from parasites, and is therefore chosen for the type of the species. The Stevens' collections are less ample, and the rust much parasitized. But it was the varied material supplied by Dr. Stevens that made it possible to delimit the species, and to him rightly belongs the honor implied in the proposed specific name.

101. **Uredo rubescens** sp. nov.

Uredinia hypophyllous, irregularly grouped on indefinite pale spots, round, small, 0.2–0.4 mm. across, soon naked as if by a central pore, surrounding epidermis scarcely noticeable except for a reddish coloration, subepidermal; paraphyses peripheral, cylindrical, hyphoid, incurved, scarcely rising above the spore-mass, the wall colorless and smooth; urediniospores ellipsoid, 18–19 by 25–28 μ; wall pale cinnamon-brown, 1.5 μ, rather closely and strongly echinulate, the pores obscure.

ON MORACEAE:

Dorstenia Contrajerva L., Camuy, Nov. *22, 5011.*

A well marked form. Although the paraphyses are not readily found except by sectioning, yet they are indicated under a hand lens as a pale circle bounding the sorus. The spores either have very short pedicels or are formed in chains, of which only one spore matures at a time. Even the best sections do not decide the matter, but it must be left to be worked out from a study of the cytological development.

102. **Uredo Bixae** sp. nov.

Uredinia epiphyllous, numerous, scattered singly or in groups of two to four on small purple spots, very small, about 0.1 mm. across, soon uncovered, ruptured epidermis inconspicuous, the paraphyses showing as a whitish circle, subepidermal; paraphyses peripheral, numerous, incurved, rising but little above the surface of the leaf, clavate-cylindric, 9–10 by 27–35 μ, the walls colorless, smooth, less than 1 μ inside and 2–5 μ outside; urediniospores obovoid, 16–23 by 26–37 μ; wall nearly colorless, thin, 1 μ or less, closely and finely echinulate, the pores obscure.

ON BIXACEAE:

Bixa Orellana L., Adjuntas, March *2, 462.*

The host is a native of tropical America, but has been cultivated and become wild in tropical regions throughout the world. It supplies the coloring matter of commerce called annatto, much used in butter.

The sori are very small, numerous and deep-seated, but in the specimen examined, they are much parasitized and the spores few.

103. UREDO CAPITULIFORMIS P. Henn. Hedwigia **34**: 97. 1895.

Ravenelia capituliformis P. Henn. Hedwigia **43**: 160. 1904.

ON EUPHORBIACEAE:

Alchornea latifolia Sw., Luguillo forest, Dec. 2, *5437*; Preston's ranch near Naguabo, Dec. 31, *6669*.

This is the first record of the occurrence of this species in North America. The type collection was made by E. Ule *3060*, at Goyaz, Brazil, and shows an abundance of the very peculiar uredinial sori. These sori arise from under the cuticle from a minute hymenial layer. They expand into a globular, brown capitulum, seated lightly on the surface of the leaf and composed of incurved, thick-walled, dark-brown paraphyses, holding a small number of spores. The appearance under a low magnifying power is much like that of the fruit of some *Erisyphe* or other Perisporiaceous fungus. The spores are equally remarkable with the sori in possessing four bulging protuberances in the upper half of the generally obovoid spore, and a similar apical protuberance. The wall of the spore is cinnamon-brown, 1–1.5 μ thick, and closely echinulate. The pores can not be located.

In these characters the rust collected by Stevens in Porto Rico agrees perfectly. In addition, however, both the Stevens' collections show well formed pycnia and aecia. The pycnia are conspicuous, epiphyllous, in small groups, mamilliform, subcuticular but depressing or absorbing the epidermal cells, 100–165 μ across; ostiolar filaments apparently wanting. The aecia are amphigenous, gregarious, more abundant on the upper surface of the leaf surrounding the pycnia. They are subepidermal, with the adjoining epidermal cells greatly elongated to form a cone about the mouth of the aecium. A persistent peridium barely protrudes beyond the leaf-surface, and the structure can not be determined with dried material. The aeciospores are catenulate with intercallary cells. They closely resemble the remarkable urediniospores in form, color and markings, but the echinulation, if such it is to be called, is considerably coarser. The finest points appear like those on the urediniospores. The points are, however, mostly conspicuously hyaline, acute warts, although their bases are too narrow for them to be unreservedly called verrucose.

The peculiar appearance of the uredinia led Hennings to place this rust in the genus *Ravenelia,* but the discovery of the aecia makes this more ill advised than at first. When the telia are found, it is more likely to constitute a new genus, or to belong to a little known one.

In the phanerogamic collection at the N. Y. Bot. Garden, pycnia and aecia were found on *A. latifolia* from island of Tortola, 1913, J. A. Shafer *1148.*

104. UREDO GOUANIAE Ellis & Kelsey, Bull. Torrey Club **24**: 209. 1897.

ON FRANGULACEAE (RHAMNACEAE):

Gouania lupuloides (L.) Urban (*G. domingensis* L.), Jajone Alto, Dec. 3, *5685;* Aguadillo, Nov. 22, *5701;* San German, Nov. 8, *5791.*

Gouania polygama (Jacq.) Urban (*G. tomentosa* Jacq.), Guanica, Feb. 3, *328.*

This form is distinguished from the uredinia of *Puccinia Gouaniae* Holw. by the reniform spores with one lateral pore. Whether this morphological difference indicates a true specific distinction, or only a racial one, is not likely to be decided until teliospores of this form are found, and possibly not until the full life cycle of both forms is known.

The collections by Dr. Stevens are the only ones known to the writer except the type collection made by A. E. Ricksecker in St. Croix, Jan., 1896.

105. UREDO COMMELYNEAE Kalchbr. Grevillea **11**: 24. 1882.

ON COMMELINACEAE:

Commelina virginica L. (*C. elegans* H. B. K.), Coamo Springs, Nov. 13, *3981.*

So far as the writer knows, this species of rust has heretofore only been known from the type collection, made at Port Natal, South Africa. Through the kindness of the Director of the Kew Gardens, I have been able to study a portion of the original material from the Kew Herbarium, and find that it agrees perfectly with the material collected by Dr. Stevens. Hoping to

secure further knowledge of so rare a tropical form, I appealed to Mr. Percy Wilson to look at specimens in the phanerogamic herbarium at the N. Y. Bot. Garden. Mr. Wilson found three collections with an abundance of the rust. They are all three on *C. virginica,* two from Porto Rico, Arecibo, Jan. 27, 1899, Mr. & Mrs. A. A. Heller *357,* Sabana Llana, Nov. & Dec., 1899, George P. Goll *164,* and one from St. Thomas, Feb., 1887, *Eggers.*

This species differs in a very marked way from the uredinia of *Uromyces Commelinae,* in having smaller and nearly colorless spores with thin walls, and especially in possessing a paraphysoid peridium opening by a central pore, similar to that described under *Uredo concors.*

106. UREDO AESCHYNOMENIS Arth. Bot. Gaz. **39**: 392. 1905.

Physopella (?) *Aeschynomenis* Arth. N. Am. Flora **7**: 104. 1907.

ON FABACEAE:

Aeschynomene americana L., Mayagüez, Oct. 31, *3945;* Ponce, Nov. 8, *4356;* Maricao, Nov. 18, *4798;* Rosario, Nov. 14, *4842;* Utuado, Nov. 8, *4581ab;* Aguada, Nov. 22, *5074.*

The species was described from Mexican material. A collection from Caracas, Venezuela, was subsequenlty communicated to the writer by W. G. Farlow. It is also reported by Mayor (Mém. Soc. Neuch. Sci. **5**: 587. 1913) from Colombia. Mayor also reports the species from the same region on *A. sensitiva* Sw.

The uredinia only are known. They possess a strongly developed pseudoperidium composed of imbricated paraphyses, a character not consistent with typical species of *Physopella.* The species is, therefore, listed here under *Uredo.*

107. **Uredo concors** sp. nov.

Uredinia hypophyllous, in small groups on discolored usually reddish spots, mammillose, small, 0.1–0.3 mm. across, finally opening by a small central pore; paraphyses united by their bases and internally imbricated to form a pseudoperidium, colorless to golden-brown, the free ends clavate, with moderately thick and

smooth wall; urediniospores ellipsoid or somewhat obovoid, 15–21 by 19–28 μ; wall nearly or quite colorless, thin, 1.5 μ, closely and finely verrucose-echinulate, the pores obscure.

ON FABACEAE:

Dolichos Lablab L., Jayuya, Dec. 17, *6042* (type).

Teramnus uncinatus (L.) Sw., Jayuya, Dec. 17, *5998*.

The *Uredo Teramni* Mayor differs greatly from the above species in having a sorus without paraphyses, and in having globose, 2-pored spores.

108. **Uredo jatrophicola** sp. nov.

Uredinia hypophyllous, crowded on slightly discolored spots or evenly scattered, bullate-conical, small, 0.1–0.3 mm. in diameter, long covered by the overarching epidermis, opening by a central pore that gradually enlarges; peridium paraphysoid, the paraphyses clavate with the slender stalks firmly united into an enclosing wall, and with the heads, 9–12 μ broad, imbricately projecting into the cavity of the sorus, the largest ones at the orifice, the wall smooth, about 1 μ thick and colorless below, about 3–7 μ and tinted above; urediniospores ellipsoid or obovoid-ellipsoid, 16–20 by 24–29 μ; wall very pale yellow or colorless, thin, 1–1.5 μ, rather closely and finely echinulate; pores not discernible.

ON EUPHORBIACEAE:

Jatropha Curcas L., Hormigueros, Jan. 14, *220* (type).

Jatropha gossypifolia L., San German, Dec. 8, *4113, 4790;* Guayama, Dec. 4, *5401;* Guayanilli, Nov. 13, *5866bis*.

The species has also been detected on phanerogamic specimens: on *J. Curcas,* St. Domingo, March, 1913, Rose, Fitch & Russell *4064;* on *J. gossypifolia,* Cuba, April, 1903, J. A. Shafer *86,* March, 1910, Britton & Wilson *5549,* St. Croix, Feb., 1913, Rose, Fitch & Russell *3204*.

The paraphysoid peridium and pale spores make a marked distinction between this and other known rusts on Euphoriaceous hosts. Small subepidermal sori were found on the two Cuban specimens that appeared like compact, lens-shaped telia, beneath the epidermis, with small, smooth, thin-walled spores, but they were very few and uncertain, and may have been only young uredinia.

109. **Uredo fenestrala** sp. nov.

Uredinia hypophyllous, irregularly scattered, or occasionally in small groups, pustular, 0.1–.25 mm. across, opening by a central pore becoming enlarged and irregular, subepidermal; peridium hemispherical, delicate, cellular, the cells elongated more or less at the sides, nearly isodiametric above, trapezoid or cuboid, 10–13 μ long, the walls evenly thin, the ostiolar cells unmodified; urediniospores obovoid or ellipsoid, inclined toward pyriform, 16–22 by 25–36 μ; wall cinnamon-brown, slightly paler below, evenly thin, 1–1.5 μ, moderately echinulate, the pores indistinct, apparently 2 or 3, somewhat superequatorial.

ON EUPHORBIACEAE:

Phyllanthus grandifolius L., Bayamon, Feb. 19, *389*, May 21, *1822* (type); Villa Alba, Jan. 4, *527*.

The rust on the same host has also been detected on a phanerogamic specimen, collected on the island of St. Domingo, Dec. 1909, N. Taylor *365*.

What appears to be the same rust showing only uredinia was collected on *Phyllanthus distichus* (L.) Mull.-Arg., San Juan, P. R., January, 1911, by E. W. D. Holway. The texture of the leaf is less firm in this host, and the rim of the sorus does not hold up sufficiently to give the crater-form appearance usually seen on *P. grandifolius*. The urediniospores are also slightly smaller and paler.

The peridium in this species is most delicate and difficult to demonstrate from dried specimens. The usual appearance in free-hand sections is that of a sorus without enveloping structures; there certainly are no paraphyses. The description of *Uredo Phyllanthi* P. Henn. from Brazil, gives the wall of the spore as smooth and 2–3 μ thick. The uredinia of *Phakopsora Phyllanthi* Diet., which occurs on *Phyllanthus distichus* in India and the Philippines, is said to have strongly developed, incurved paraphyses. The descriptions only of these two species are available to the writer, and they indicate decidedly unlike forms, both of them differing from that in the West Indies.

(To be continued)

SOME PORTO RICAN PARASITIC FUNGI

PHILIP GARMAN

(WITH PLATE 171, CONTAINING 7 FIGURES)

The following descriptions and notes have been made upon Porto Rican fungi collected by Dr. F. L. Stevens during the years 1912 and 1913. A description of the material contained in this collection has already been given in a paper by Miss Esther Young.[1] The types and cotypes of new species have also been distributed as set forth in that article.

Thanks are due to Dr. F. L. Stevens for his many helpful suggestions, without which the work would not have been possible. The species of hosts, with few exceptions, have been determined by Dr. N. L. Britton and Mr. Percy Wilson, of the New York Botanical Garden, and to them also I wish to express my thanks.

SEPTORIA Fries

1. **Septoria Petitiae** sp. nov.

Spots 1–2 mm. in diameter, suborbicular, with a white center and a brownish or fuscous margin; perithecia about 0.1 mm. in diameter, black, two or three to a spot; spores slightly curved, hyaline, 2-guttulate, 16–46 × 1.2 μ. (*Pl. 171, f. 1.*)

On leaves of *Petitia domingensis* Jacq. in Porto Rico: Cabo Rojo, *6470* (type), *9756*.

2. **Septoria Miconiae** sp. nov.

Spots about 1.2 mm. in diameter, circular, with a white center and a brown and distinctly elevated margin; perithecia 50 μ in diameter, black, immersed; ostiole 24–48 μ in diameter; spores three- to many-guttulate, usually curved and hyaline, 19–26 × 2 μ. (*Pl. 171, f. 2.*)

On leaves of *Miconia laevigata* DC. in Porto Rico: Las Marias, *117, 357* (type), *369*.

[1] MYCOLOGIA, 7: 143–150. 1915.

3. **Septoria Guettardae** sp. nov.

Spots large, 4–5 mm. or more in diameter; margin irregular and dark-red, the center of the spot becoming white and contrasting strongly with the remainder of the leaf; perithecia black, 50 μ in diameter; ostiole about 24 μ in diameter; spores curved, hyaline, many-guttulate, 28–38 × 2.4 μ. (*Pl. 171, f. 3.*)

On leaves of *Guettarda ovalifolia* Urb. in Porto Rico: Monte Alegrillo, *9759* (type).

4. **Septoria Lantanae** sp. nov.

Spots varying from 1–2 mm. in diameter, somewhat irregular in outline, sooty; perithecia 76–96 μ in diameter; ostiole indefinite, about 40–60 μ in diameter; spores long, slightly curved or straight, several-septate, 24–50 × 2.4 μ. (*Pl. 171, f. 4.*)

On leaves of *Lantana camara* L. in Porto Rico: *221x* (type).

This species differs decidedly from *S. Verbenae* in the character of the leaf spot which lacks the white center.

5. **Septoria Pityrogrammae** sp. nov.

Spots brown, indefinite; perithecia 96 μ in diameter, black; ostiole 20–30 μ in diameter; spores long and thread-like, 3–4-spetate, sometimes apparently continuous, hyaline, curved and acute at both ends, 40–60 × 2.4 μ.

On leaves of *Pityrogramma calomelanos* L. Indiera Frios, Maricao, *3484* (type).

This species is near *S. aquilina* Passer, from which it differs mainly in spore characters, the spores of this species being distinctly curved, acute at both ends and only one-half the diameter of the species *S. aquilina* on *Pteris*.

6. SEPTORIA ASIATICA Speg. Fungi Chilenses 168. 1910

On leaves of *Centella asiatica* Urb. in Porto Rico: Vega Baja, Santurca San Sebastian, *265, 4231, 5207*.

7. SEPTORIA CHELIDONII Desm. Ann. Sci. Nat. II. **17**: 110. 1842

On leaves of *Argemone mexicana* L. in Porto Rico: Guayama, *5398*.

In the following descriptions of the genera related to *Dimerosporium* and originally included under this head by Saccardo, the work of Thiessen[2] has been followed rather closely. Several species commonly known as *Parodiella* seem to fall within the limits of this classification, and have been moved to what appears to be a more natural position within the "Dimerineae."

DIMERIUM Sacc. & Syd.

1. **Dimerium Cayaponiae** sp. nov.

Spots black, sooty, epiphyllous and irregular in outline, never more than 3 mm. in diameter; perithecia black, globose, 0.12 mm. in diameter; asci linear-clavate, eight-spored, 33.6–36 × 2.4 μ; spores two-celled, dark, smoky, one cell considerably smaller than the other, 7.3–9.6 × 3.6–5 μ. (*Pl. 171, f. 5.*)

On leaves of *Cayaponia americana* (Lam.) Cogn. in Porto Rico: Utuado, *4360* (type).

The dark, black spot is characteristic of the species. This is formed partly of discolored host tissue and partly of a dense compact fungous mycelium.

2. **Dimerium grammodes** (Kuntze) comb. nov.

Dothidea perisporioides Berk. & Curt. Grevillea **4**: 103. 1876.
Sphaeria perisporioides Berk. & Curt. Grevillea **4**: 102, 107. 1876.
Dothidella grammodes Sacc. Syll. Fung. **2**: 634. 1883.
Dothidea grammodes Berk. Jour. Linn. Soc. **10**: 341. 1869.
Dothidea seminata Berk. & Rav. Grevillea **4**: 104. 1876.

On leaves of *Crotalaria retusa* L., *Phaseolus lunatus* L., *Meibomia adscendens* O. Kuntze, and an undetermined legume belonging to the Papilionaceae, in Porto Rico: Maunabo. Papilionaceae, *2452;* Utuado, *4418;* Aguadilla, *Phaseolus lunatus, 5027;* Guayama, Cabo Rojo, *Crotalaria retusa, 5333, 6480;* Rio Piedras, *Meibomia adscendens, 5723.*

This pretty and widespread species occurs, as can be seen from the above, on a variety of leguminous hosts in Porto Rico. It does not differ essentially from the descriptions of the species from other parts of the world. The specific name *grammodes*

[2] Zur Revision der Gattung Dimerosporium. Botanische Centralblatt **29**: pt. 2; 45–73. 1912.

has been used recently by Rehm; *perisporioides* being the most frequently used up to that time. The original works of Kuntze, containing descriptions or exsiccati have not been available, and the change is herewith accepted solely upon the authority of Rehm. The fungus is placed in *Dimerium* because it offers no striking differences from other members of that genus.

3. **Dimerium melioloides** (Berk. & Curt.) comb. nov.

Parodiella melioloides Winter, Hedwigia **24**: 257. 1885.
Dimerosporium lateritium Speg. Fungi Puiggariani Pug. **1**: 110. 1889.

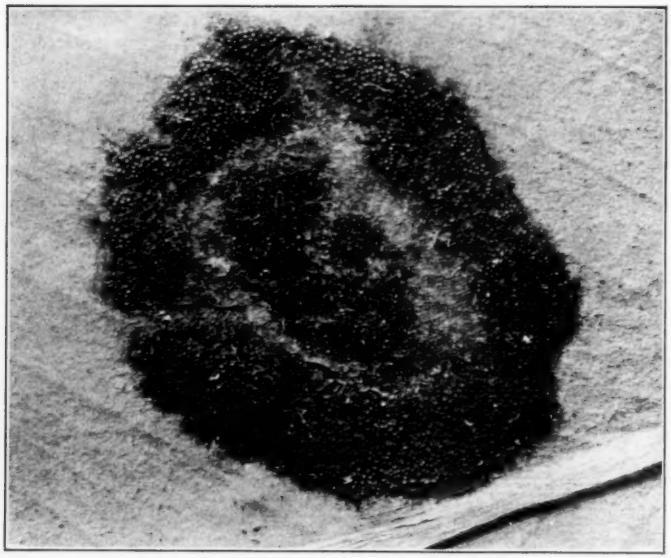


FIG. 1. *Dimerium melioloides*, showing concentric arrangement of perithecia.

Sphaeria melioloides Berk. & Curt. Jour. Linn. Soc. **10**: 387. 1869.
Rosellinia melioloides Sacc. Syll. Fung. **1**: 276. 1882.
Nectria megalospora Sacc. & Berl. Rev. Myc. **7**: 157. 1885.

On leaves of *Clusia rosea* Jacq. in Porto Rico: Maricao *285a, 816, 946, 3615.*

The species is referred to the genus *Dimerium* and differs from the usual form occurring in *D. grammodes* in the possession of a compact, radiate mycelium on the surface of the leaf. The species *D. melioloides* has been placed in the genus *Parodiella* by Rabenhorst and Winter, and distributed in their exsiccati under that name, but there is some uncertainty as to its real position as shown by the location originally given it by Saccardo.[3] The majority of the material at hand possesses spores that are only feebly colored, together with a few dark spores, but the large amount of material examined would seem to indicate that the dark spores occur only occasionally.

4. **Dimerium Stevensii** sp. nov.

Spots irregular in outline, one to several mm. in diameter; perithecia sperical, black, shining, 100 μ in diameter; asci clavate, 42–50 $\times$ 20–22 μ; spores slightly greenish-hyaline, sometimes dark, two-celled, 16–20 $\times$ 6–8 μ; paraphases abundant.

On leaves of *Cordia corymbosa* (L.) G. Don. Quebradillos, "College Grounds," Mayaguez, *934* (type); Maricao *4816*.

DIMERINA Thiessen

1. **Dimerina Jacquiniae** sp. nov.

Spots small, 0.25 μ in diameter, composed of a number of black, spherical perithecia, usually about 10; mycelium scant, loose, slightly reddish; perithecia black, 48–60 μ in diameter; asci hyaline, ovate, 26.4 $\times$ 12 μ; spores slender and hyaline, 14.4–17 $\times$ 3.6 μ.

On leaves of *Jacquinia barbasco* (Loefl.) Mez. Mona Island, *6087* (type).

PHYLLACHORA Nitschke

1. PHYLLACHORA PERIBEBUYENIS Speg. Rev. Myc. 9: 95. 1887

On leaves of the Melastomataceae, especially *Miconia prasina* DC., *M. laevigata* DC., *M. Sintensii* Cogn., *Heterotrichum cymosum* Urb., and a species of *Tetrazygia:* in Porto Rico: Maricao, Consumo, Las Marias, *166, 741, 840, 1355a, 4708; Miconia laevi-*

[3] Saccardo: Sylloge Fungorum 1: 276.

gata: Villa Alba, Maricao, Rosario, *84, 162, 163, 171, 742a, 4813; Miconia* sp., Monte Alegrillo, *1355; Miconia Sintensii,* St. Ana, *6656; Tetrazygia* sp., Jayuga, *500; Heterotrichum cymosum,* Indiera Fria (Maricao), Manati, Ponce, Utuado, Maricao, Quebradillas, San Sebastian, Luquillo Forest, Jajome Alto, Giganta near Adjunta, Prestons Ranch, Dos Bocas, *3372, 4326, 4374, 4380a, 4391, 4392, 4705, 4984, 5206, 5595, 5652, 5941, 6779, 6859;* on various Melastomataceae.

This exceedingly common species in Porto Rico is undoubtedly Spegazzini's *P. peribebuyensis,* as shown by a comparison with exsiccati of Roumeguere (Fungi Gallici Exsiccati *3234*). Its systematic position becomes doubtful, however, when we examine the character of the stroma and its attachment to the leaf. No species of *Phyllachora* have been described which possess the central stroma attachment (see *fig. 7*) that this species possesses, and the more common species of *Phyllachora* such as *P. graminis* differ so much from this type both in the shape and relative position of the stroma that it would seem advisable to make this and other species of the same nature into a new genus. In Saccardo's description of *peribebuyensis,* he questions the true position of the fungus and states that it is closely related to, though different from, *Bagnisiella,* a closely allied form. His generic description also contains the statement that many forms have been collected under the genus name *Phyllachora,* which properly belong elsewhere. In keying the species out through the analytical tables offered by Saccardo and Lindau in Engler and Prantl, the species falls into *Bagnisiella* and seems to be totally excluded from *Phyllachora* by the nature of the stroma. Saccardo, however, states that *peribebuyensis* is different from anything in *Bagnisiella,* and judging from descriptions and figures of *Bagnisiella,* this is correct. Considering the character of the stroma alone, then, the erection of a new genus would seem to be necessary. Recent authors are, on the other hand, inclined to disregard stromal characteristics and to found classifications on more fundamental bases. The species has, therefore, been left in its original position because it is not different in other respects from typical species of *Phyllachora.*

2. Phyllachora nitens sp. nov.

Stroma forming a large black shining spot, often covering an area as much as 1 cm. in diameter; asci clavate, eight-spored, 100–110 × 12–16 μ; spores mostly ovate, somewhat acute at one end, hyaline and slightly granular; 6–8 × 10–12 μ; paraphases present.

On leaves of *Schlegelia brachyantha* Guseb.; in Porto Rico: Maricao, *873* (type), *857;* Ponce, *4352;* Monte Alegrillo, *4501;* Rio Grande, *4502;* Prestons Ranch, *6776.*

3. PHYLLACHORA RENALMIAE Rehm, Hedwigia **36**: 373. 1897

On leaves of *Alpinia antillarum* R. & S., in Porto Rico: Maricao, Monte Alegrillo, *805, 2344.*

The following collections possess the typical stroma but lack asci and ascospores: Maricao, *192, 705;* Rio Maricao, *3606;* Utuado, *4385a;* Jajome Alto, *5654;* Yunque, *2385;* Monte Alegrillo, *4749.*

4. PHYLLACHORA SPHAEROSPERMA Winter, Hedwigia **23**: 170. 1884

On leaves of *Cenchrus echinatus* L. and *C. myosuroides* H.B.K. Vega Baja, *1730, C. echinatus;* Mona Islands, *6330, C. myosuroides.*

5. PHYLLACHORA GRAMINIS (Pers.) Fuckel, Symb. Myc. 218. 1869

On leaves of *Panicum, Andropogon brevifolius* L., *Lasiacis Swartziana* Hetche, and a species of *Paspalum,* in Porto Rico: Luquillo Forest, *4527, Panicum;* Maricao, *168,* Rio Piedras, *5751, Andropogon brevifolius* L.; Jajome Alto, *5657, Lasiacus Swartziana* Hetche; Sabana Grande, *317, Paspalum.*

6. PHYLLACHORA ANDROPOGONIS (Schw.) Karst. & Har. Rev. Myc. **12**: 172. 1890

On leaves of *Paspalum Underwoodii* Nash, in Porto Rico: Prestons Ranch, *6763.*

The species differs from *P. graminis* in spore size, which

character seems to be fairly constant. In *P. graminis,* however, there is some variation and it would seem as though the species described under that name would also include the variety *"tupi"* of Spegazzini. The divergence in this case from the typical *P. graminis* is sufficient, I think, to warrant the maintainance of the species name *Andropogonis.*

7. PHYLLACHORA PERFORANS (Rehm) Sacc. & Syd. Hedwigia **39**: 232, *fig. 4.* 1900

P. paulensis Rehm, Ascom. Exc. 1747. 1907, Ann. Myc. 471. 1907.

P. dalbergiicola Henn. var. *perforans.* Rehm, Hedwigia **1906**: 232. *fig. 4.*

On leaves of *Abrus precatorius* L. in Porto Rico: Mayagüez, *313, 1196.*

AUERSWALDIA Sacc.

AUERSWALDIA PALMICOLA Speg. Fungi. Guar. Pug. **1**: 121. 1883.

On leaves and petioles of *Ascrista monticola* Cook. Adjuntas, El Gigante, *6065.*

This fungus agrees in all features with the description given by Saccardo. In the specimens at hand, very little coloration occurs in the spores. Comparisons with exsiccati (Roum. Fungi Gall. *4067*), however, show that the form is without doubt *Auerswaldia.*

UNIVERSITY OF ILLINOIS,
URBANA, ILL.

EXPLANATION OF PLATE CLXXI

Fig. 1. *Septoria Peititiae* sp. nov. a. Leaf, showing spots. × ½. *b.* Spot, slightly enlarged, showing pycnidia. *c.* Spores × 200.

Fig. 2. *Septoria Miconiae* sp. nov. *a.* Leaf, showing spots. × ½. *b.* Spot enlarged about 12 diameters. *c.* Spores × 480.

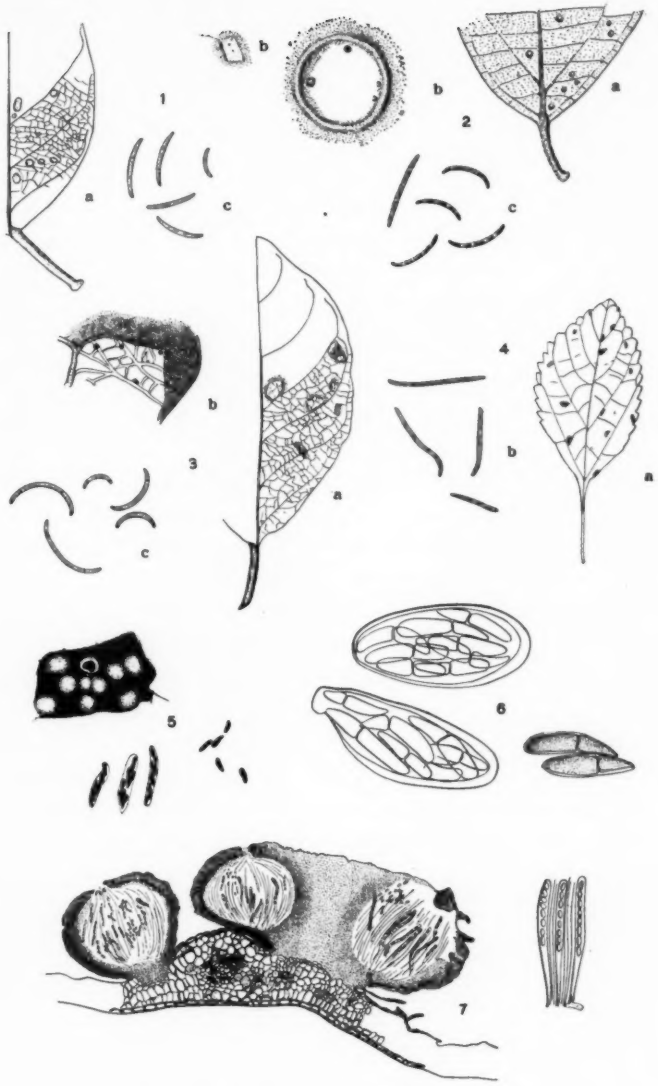
Fig. 3. *Septoria Guettardae* sp. nov. *a.* Leaf with spots. × ½. *b.* Spot, enlarged. *c.* Spores × 275.

Fig. 4. *Septoria Lantanae* sp. nov. *a.* Leaf with spots. × ½. *b.* Spores × 500.

Fig. 5. *Dimerium Cayaponiae* sp. nov., showing pycnidia, asci and ascospores, much enlarged.

Fig. 6. *Dimerium melioloides,* asci and spores, enlarged.

Fig. 7. *Phyllachora peribebuyensis,* cross section of stroma (left) and group of asci, all much enlarged.



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